

I claim:

1. A method for positioning and tracing of a guiding channel during surgery, employing an imaging system, said method comprising the steps of:
  - acquiring an image of a portion of a human body where surgery is to take place;
  - fastening a surgical tool to a moving arm in at least two reference locations of said surgical tool;
  - moving said surgical tool outside of the human body and near said portion where surgery is to take place;
  - estimating the coordinates of said two reference locations of said surgical tool in response to said movement of said surgical tool;
  - calculating the trajectory of said surgical device for a distance extending from said surgical device to inside said human body;
  - superimposing an image of said trajectory on said acquired image, so as to allow visualization of a path extending from said surgical tool to inside said human body;
  - and
  - displaying said superimposed image for visualization by said surgeon.
2. The method in accordance with claim 1 further comprising the steps of acquiring multiple images of said portion of human body before said estimating step.
3. The method in accordance with claim 2, further comprising the step of calculating said trajectory for each one of said acquired images.

4. The method in accordance with claim 3, further comprising the step of displaying said trajectory for visualization on each of said acquired images.
5. The method in accordance with claim 1 wherein said step of moving said surgical tool further comprises the step of employing a pantoguide, fixedly coupled to a plane.
6. The method in accordance with claim 5, further comprising the step of measuring a deformation angle and a rotation angle of said pantoguide as said surgical tool moves.
7. The method in accordance with claim 1 further comprising the step of estimating the projection of images of objects in the proximity of surgery area on to the image space of said acquired images.
8. The method in accordance with claim 7 further comprising the steps of estimating the projection of images of a plurality of markers attached to said moving arms, with previously known locations.
9. The method in accordance with claim 8 further comprising the step of employing a motor mechanism for moving said surgical tool remotely.

10. The method in accordance with claim 1 further comprising the step of restricting movement of said first and second reference locations to a corresponding first and second fixed planes.
11. A system for positioning and tracing of a guiding channel during surgery on a patient, said system comprising :
- a first moving arm pivotally fixed to a first fixed plane;
  - a second moving arm pivotally fixed to a second fixed plane;
  - a pair of guiding channel fasteners each coupled to said first and second moving arms and configured to attach to a guiding channel at a corresponding first and second reference locations; and
  - an encoder unit coupled to said moving arm, said encoder unit configured to provide signals so as to allow an estimate of the coordinates of said reference locations.
12. The system in accordance with claim 11 further comprising a processor coupled to said encoder unit configured to calculate a trajectory of a line extending from said surgical tool towards the interior portion of said patient.

13. The system in accordance with claim 12 further comprising an imaging unit configured to acquire images of the interior portion of said patient's body.
14. The system in accordance with claim 13 further comprising a display means configured to display the trajectory of said guiding channel within the patient's body.
15. The system in accordance with claim 14, wherein said moving arms are each attached to a pantoguide.
16. The system in accordance with claim 15, wherein said encoder unit further comprises angle encoders for measuring deformation and rotation angle of said pantoguide.
17. The system in accordance with claim 16 further comprising a motor mechanism coupled to said moving arms so as to remotely control the movement of said moving arms.
18. A system for positioning and tracing of a guiding channel during surgery on a patient, said system comprising:  
a first pantoguide unit having four moving arms pivoted together by pivot points, wherein one of said pivot points is fixedly attached to a

first surface, and wherein one of said arms is extended to define a first moving arm;

a second pantoguide unit having four moving arms pivoted together by pivot points, wherein one of said pivot points is fixedly attached to a second surface, and wherein one of said arms is extended to define a second moving arm, said first and second surface are fixedly apart from each other;

a first fastening unit coupled to said first moving arm and a second fastening unit coupled to said second arm, wherein said fastening units are configured to attach to a guiding channel at a first and second reference locations; and

an angle encoder coupled to each of said first and second pantoguides configured to provide information corresponding to deformation and rotation angles of said pantoguides as said first and second reference locations move in a surgery space.

19. The system according to claim 18 wherein said first and second surfaces are disposed in parallel to each other.

20. The system according to claim 19 further comprising a processor configured to receive said information provided by said angle encoders.

21. The system in accordance with claim 20, wherein said processor is further configured to calculate the coordinates of said first and second reference locations based on said angle information received from said angle encoders.
22. The system in accordance with claim 21, wherein said processor is further configured to calculate a trajectory of a line extending from said first and second reference locations based on said calculated coordinates.
23. The system in accordance with claim 22 further comprising an image acquisition system configured to acquire images of interior portions of a patient proximate to location of an intended surgery.
24. The system in accordance with claim 23, wherein said processor is further configured to superimpose said calculated trajectory on images acquired by said image acquisition system so as to allow visualization of said line within the patient's body.
25. The system in accordance with claim 23, wherein said processor is further configured to calculate the projection of images from said surgery space to an image plane of said acquired images.

26. The system in accordance with claim 24 further comprising a motor mechanism so as to remotely control the movement of said moving arms.